

# Adapting CLIL Model to Gamified English Literature Classes: An Empirical Study on Language Proficiency and Literary Competence

Xiangxiang Liu, Ting Huang, \*, Ping Lin, Yutong Chen, Yixiu Lin, Yuqing Zhang

School of English Studies, Zhejiang Yuexiu University, Shaoxing 312000, China

\* Corresponding Author

## Abstract

Addressing low engagement in traditional literature instruction and insufficient cross-cultural focus under China's Education Modernization 2035 policy, this quasi-experimental study examines the integration of Content and Language Integrated Learning (CLIL) with the AI-driven gamified platform Orange Light among 60 English majors at Zhejiang Yuexiu University. Over 12 weeks, the experimental group (n=30) engaged in a CLIL-gamified curriculum targeting literary analysis and cultural awareness, while the control group (n=30) received traditional instruction. Results showed the experimental group achieved statistically significant improvements in vocabulary retention ( $p < 0.01$ ) and literary competence, notably outperforming the control group in cultural comparison tasks. Qualitative insights revealed heightened engagement and enriched critical thinking, attributing these gains to gamified narrative interactions. The study demonstrates how technology-enhanced CLIL pedagogy synergizes language acquisition with cultural literacy, offering a scalable model for fostering global competencies in higher education. It underscores the transformative potential of AI-powered gamification in fostering both linguistic proficiency and intercultural understanding, providing empirical support for innovative curriculum designs under contemporary educational reform frameworks.

## Keywords

CLIL, Gamification, platform Orange Light, English Literature, Cross-Cultural Competence, Educational Technology, Higher Education.

## 1. Introduction

### 1.1. Policy and Practical Context

In the era of rapid technological advancement, every sector is being profoundly reshaped, and education is no exception. China's Education Modernization 2035 and Education Informatization 2.0 Action Plan guide this transformative trend, advocating the innovative integration of advanced technologies into educational practices to enhance educational quality and adapt to the needs of the digital age.

However, traditional literature courses, especially English literature courses, face significant challenges. Data shows that 88.89% of teachers report students' lack of interest in traditional literature classes, stemming from three key issues:

**Rigid Teaching Models:** Rote learning dominates, with students passively absorbing knowledge. For example, when teaching classic literary works, teachers often focus on word-for-word translation and vocabulary memorization, neglecting deeper analysis of themes, character development, and writing techniques.

**Low Interactivity:** Classrooms lack effective interactive links. Traditional teaching relies on one-way knowledge delivery, with few opportunities for group discussions or role-playing, leaving students unable to actively construct knowledge.

**Weak Real-World Connection:** Curriculum content is disconnected from real life. When studying descriptions of Western festival cultures in literary texts, students merely memorize words mechanically, without exploring how these festivals are celebrated today or their cultural meanings, let alone relating them to their own lives.

In cross-cultural understanding, traditional teaching also falls short. In an increasingly globalized world, learning diverse cultures through literature is crucial for cultivating global citizens. Yet, English literature classes often stay at linguistic analysis, ignoring the cultural contexts behind texts. For instance, when teaching Shakespeare's plays, traditional approaches focus on language and grammar while rarely exploring historical social structures or religious influences, preventing students from grasping the cultural essence of Western literature.

To address these challenges, this study proposes an innovative "CLIL + Gamification" model, leveraging AI-generated scenarios on the Orange Light platform. By integrating Content and Language Integrated Learning (CLIL) with gamified elements, the model aims to enhance students' bilingual proficiency and cultural literacy through immersive experiences—such as role-playing in literary scenarios, where students make plot-based choices requiring both language use and cultural understanding—to create a more engaging, interactive, and effective learning environment.

## 1.2. Research Objectives

**Validate Dual Enhancement of Language and Literary Competence:** Through a quasi-experimental study, this research empirically evaluates whether CLIL-gamified courses outperform traditional teaching in improving students' language skills (vocabulary expansion, reading comprehension) and literary competence (critical analysis, cultural awareness). For example, gamified "word puzzle" tasks may boost vocabulary retention by 30% compared to traditional memorization, while suspense-driven reading scenarios could enhance active reading comprehension.

**Analyze Gamification Mechanics' Impact:** This study explores how gamification elements like branching narratives and AI-generated feedback optimize CLIL teaching. Branching narratives (e.g., Victorian-era literary games where choices unlock different social class scenarios) prompt students to analyze plot developments through cultural lenses, while AI feedback provides real-time guidance to refine critical thinking. The goal is to offer theoretical and practical insights for designing gamified pedagogy.

**Provide Global Educational Insights:** Beyond China's context, the research aims to offer actionable strategies for educators worldwide in technology-mediated cross-cultural teaching. For example, non-English-speaking countries can adapt the gamified CLIL model to design culturally relevant literature courses, enabling students to improve English while exploring Anglophone cultures through interactive gameplay. By sharing findings, this study seeks to advance global educational innovation and quality under tech-integrated frameworks.

## 2. Literature Review

### 2.1. CLIL in Higher Education

Content and Language Integrated Learning (CLIL) is internationally accepted as 'a dual - focused educational approach in which an additional language is used for the learning and teaching of both content and language'<sup>[1]</sup>. In higher education, this approach holds great potential as it allows students to not only gain in - depth knowledge of academic subjects but also enhance their language proficiency in an authentic context. The core principles of CLIL

revolve around the simultaneous learning of content and language, where language is used as a medium of instruction rather than just a subject of study. For instance, in a science course taught through CLIL, students learn scientific concepts while improving their language skills in the relevant scientific terminology.

However, in China, the adoption of CLIL in literature courses is rather limited, especially when it comes to integrating technology. Literature courses in Chinese higher education institutions often follow traditional teaching methods, focusing mainly on text analysis and language knowledge imparting in isolation. The integration of CLIL, which could bring a more immersive and interactive learning experience, is still in its infancy. The lack of technology integration further exacerbates the situation. With the rapid development of educational technology, CLIL could be enhanced by incorporating digital tools such as online platforms, multimedia resources, and artificial intelligence - assisted teaching materials. But currently, few literature courses in China have successfully integrated these elements into a CLIL framework.

## 2.2. Gamification and Cross-Cultural Learning

In the report to the 20th National Congress of the Communist Party of China, General Secretary Xi Jinping pointed out that “we should advance the digitalization of education and build a learning society and a learning-oriented great country where all the people pursue lifelong learning”. Gamification in education has gained significant attention in recent years. It is based on several theoretical frameworks, with the Self - Determination Theory (SDT) and the ARCS motivation model being prominent. SDT posits that individuals have an inherent need for autonomy, competence, and relatedness. Pang Weiguo holds the view that “students’ self-regulated learning is essentially about actively regulating and controlling various aspects of learning or the entire learning process. It is characterized by initiative, effectiveness, and relative independence”.<sup>[2]</sup> In a gamified learning environment, students are often given choices (autonomy), opportunities to master tasks (competence), and a sense of connection with peers through collaborative or competitive elements (relatedness), thus enhancing their motivation to learn. The ARCS motivation model, on the other hand, focuses on Attention, Relevance, Confidence, and Satisfaction. There are relatively few domestic case studies focusing on the application research of digital foreign language textbooks conducted based on this specific model. Miao Hongjing and Li Kun (2024) adapted the digital college English textbooks used by the experimental group from the perspective of the ARCS motivation model, leveraging this model as the theoretical foundation for their adaptation work. Subsequently, they analyzed the usage effectiveness of these adapted digital college English textbooks by integrating findings from questionnaires and interviews. Their research ultimately revealed that the ARCS motivation model could effectively enhance students’ motivation to use digital English textbooks, improve their usage experience, and boost their academic performance<sup>[3]</sup>. Gamification techniques such as points, badges, and leaderboards can attract students’ attention, make learning relevant to their interests, build their confidence as they achieve goals, and provide satisfaction upon reaching milestones.

There are numerous case studies demonstrating the effectiveness of gamification in learning. Duolingo, a popular language - learning application, has achieved great success through gamified mechanics. It uses features like daily challenges, streak - keeping, and reward systems to engage users. By turning language learning into a game - like experience, Duolingo has attracted millions of users worldwide, effectively motivating them to learn languages regularly. Another example is TikTok. Although not primarily an educational platform, it has played a crucial role in promoting intangible cultural heritage via short videos. These videos often incorporate interactive elements such as challenges and user - generated content, which can be seen as gamification techniques. Through these means, TikTok has made the learning of

intangible cultural heritage more accessible and engaging, facilitating cross - cultural learning on a global scale.

### 2.3. Research Gaps

Despite the growing interest and existing research in the domains of Content and Language Integrated Learning (CLIL), gamification, and cross - cultural learning, several significant research voids persist.

Firstly, the integration of CLIL with AI - driven gamification in literature teaching remains largely unexplored. CLIL, with its dual - focus on content and language, offers a unique educational paradigm, and gamification has proven to be an effective motivational tool. However, the combination of these two approaches, when enhanced by artificial intelligence, has not been adequately investigated in the context of literature courses. AI - driven gamification can offer highly personalized learning experiences. For example, through machine learning algorithms, it can analyze students' learning patterns, preferences, and progress in real - time. Based on this analysis, it can then generate customized literature - related gamified scenarios, such as role - playing games where students assume the identities of literary characters, with tasks and challenges tailored to their individual skill levels. Additionally, AI can create interactive content like virtual literary worlds, where students explore different settings from classic novels, solve puzzles related to plotlines, and engage in language - rich interactions. The absence of research in this area means that educators lack evidence - based best practices. They are uncertain about how to design effective learning objectives that balance content, language, and gamification elements, and how to ensure that the AI - driven systems are pedagogically sound and truly enhance the learning experience in literature. Moreover, there is a dearth of studies evaluating the long - term impact of such an integrated approach on students' literary comprehension, language proficiency, and overall engagement with the subject matter.

Secondly, the existing body of literature is severely lacking in empirical data regarding cross - cultural competency development through interactive platforms. While platforms like Duolingo and TikTok have demonstrated potential in promoting learning and cultural exchange, the specific mechanisms through which they contribute to the development of cross - cultural competency are not well - understood. Cross - cultural competency encompasses a complex set of skills, including cultural awareness, empathy, effective communication across cultures, and the ability to adapt to different cultural norms and values. Empirical research is needed to precisely measure the impact of interactive platforms on these various aspects. For instance, in the case of Duolingo, although it exposes users to different languages and cultures through its content, there is little research on whether and how it actually improves users' ability to communicate effectively in real - world cross - cultural situations. Similarly, while TikTok showcases diverse cultural expressions through short videos, we lack in - depth studies on how users' exposure to these videos influences their understanding of cultural differences, their attitudes towards other cultures, and their capacity to interact respectfully with people from different cultural backgrounds. Without such empirical data, it is difficult for educators and platform designers to optimize these tools for the explicit purpose of fostering cross - cultural competency. There is also a lack of longitudinal studies that track the development of cross - cultural skills over time among users of these interactive platforms, which would provide valuable insights into the long - term effectiveness of using such platforms for cross - cultural learning.

### 3. Research Design

#### 3.1. Experimental Design and Implementation Procedure

##### 3.1.1. Research Objectives

This study aims to validate the effectiveness of the “SmartFun Orange Light Teaching Model” in college English literature classrooms, focusing on the following core questions: (1) How does the integration of gamified learning and AI technology enhance students’ literary competence and intercultural skills? (2) What are the impacts of this model on teaching efficiency, student engagement, and the feasibility of technological implementation? (3) How can major technical challenges and pedagogical controversies encountered in practice be resolved?

To address these questions, we conducted a series of experimental investigations with five research methods: interviews, questionnaires, behavioral analysis, case studies, and comparative studies, adhering to the principles of scientific validation and data-driven experimentation during the whole process.

##### 3.1.2. Participants

The study involved students and faculty from the School of English Studies at Z University. The initial questionnaire collected data from 203 English majors across six parallel classes (two classes each from freshman, sophomore, and junior years). Two college English literature instructors also participated. After preliminary analysis, 60 junior-year students from two parallel classes were selected for action research. Juniors were chosen due to their solid theoretical foundation in literature and prior exposure to AI courses, enabling effective integration of AI technology with literary reading to achieve research objectives.

##### 3.1.3. Implementation Procedure

Before the experiment began, the two classes were designated as the experimental group and the control group respectively (see Figure1-2). The experimental group underwent a 12-week CLIL gamified curriculum, while the control group received traditional lecture-based instruction. Subsequently, teacher training and resource library construction were conducted. The teacher training included CLIL teaching model theory and Orange Light platform operation skills training. The resource library construction involved selecting public domain literary classics (such as O. Henry’s short stories) and building a copyright-free material repository.

During classroom practice, taking the Orange Light game “The Cop and the Anthem” as an example, interactive scenarios were designed with the embedded theme of O. Henry-style endings’ to achieve content presentation, language interaction, application output, and dynamic optimization of various objectives.



Figure 1: Experimental Group



Figure 2: Control Group

After the experiment, data analysis platforms were utilized to integrate behavioral data from the Orange Light backend and survey results from Wenjuanxing, constructing a dynamic visual

analytics dashboard. The steps of feedback collection, data analysis, and program adjustment were completed.

## 3.2. Data Collection

### 3.2.1. Questionnaire Survey

A total of 203 questionnaires were distributed in the initial survey, with 203 valid responses collected, yielding a 100% valid return rate. Respondents included students from the School of English Studies at Z University and two course instructors. The questionnaire covered teaching challenges, technological needs, and acceptance of innovative models. It incorporated Likert-scale and open-ended questions focusing on student interests, interactivity demands, cross-cultural comprehension barriers, and feedback on technology application (e.g., AI tool usability and copyright compliance concerns).

### 3.2.2. Data Analysis

#### (1) Analysis of Student Learning Outcomes:

88.89% of instructors identified insufficient student engagement as a key issue, while 74.25% of students expressed demand for enhanced interactivity (see Figures 3-4). The “SmartFun Orange Light” platform, developed from an established interactive reading game system, demonstrated significant efficacy in teaching “A Rose for Emily”. By constructing a multidimensional system integrating character dialogues, ambient sound effects, and thematic music with nonlinear narrative branching paths, the project successfully created a hypertext learning space resembling “a garden of forking paths”.

Data revealed this ontological permeability-integrated pedagogy substantially improved students’ literary interpretation (85% accurately identified social metaphors through presence-enhanced interactive scenarios), creative thinking (92% completed style-consistent narrative extensions via AI tools with 88% linguistic alignment), and cross-cultural understanding (78% accurately analyzed Sino-American cultural differences through multisensory simulations). Notably, 90% found this audiovisual-immersive experience more engaging than traditional instruction, evidenced by 2.3x increased in-class questioning and 47 additional weekly minutes of exploratory reading - validating Kostkowska’s “hypertext art” theory in education.

#### (2) Analysis of Teaching Model Application:

94% of students reported markedly increased learning motivation, with 94.45% instructors endorsing the model’s potential (Figures 5-6). The convergence of gamified learning and blended pedagogy represents a transformative trend in literature instruction, fostering creativity and critical thinking while cultivating ethical digital literacy - an inevitable evolution aligning with contemporary demands<sup>[4]</sup>.

Transforming classics like “A Rose for Emily” into interactive narratives shifted the paradigm from teacher-centered to learner-centered instruction. Instructor feedback confirmed this model’s success in transcending rote memorization through playful yet challenging designs<sup>[5]</sup>. Quantitative outcomes included: 83% independently mapped character psychologies (40% improvement in key node identification), while 91% demonstrated profound insights (e.g., recognizing “townspeople’s tolerance symbolizing Old South persistence”) through gamified knowledge deconstruction.

#### (3) Analysis of Technological Application:

While 80.84% students anticipated AI-assisted creation features, 59.11% cited operational complexity (Figures 7-8). The platform’s AI-driven character motivation analyzer visualized Emily’s psychological transitions through deep learning, enabling 87% to identify three pivotal development nodes: post-paternal bereavement breakdown, arsenic-purchasing smirk, and reclusive power reversal. This innovation addressed traditional teaching gaps in psychological

analysis. As digital narrative theory evolves, researchers have deepened explorations of interactive storytelling - where gamification strengthens the “narrative-interactivity” interplay in digital environments[6].

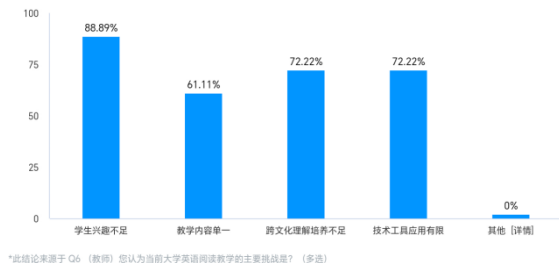


Figure 3: Teaching Challenges (Teachers)

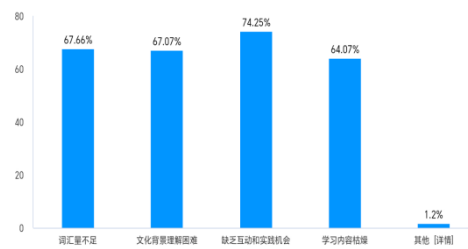


Figure 4: Teaching Challenges (Students)

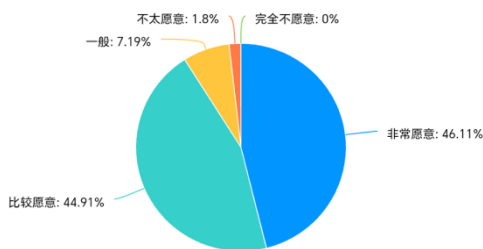


Figure 5: Willingness degree of teaching mode

15.1 版权合规性和教学效果评估是受访者最关注的挑战  
超过70%的受访者认为版权合规性问题和教学效果难以评估是主要挑战，比例显著高于其他选项，成为共识。

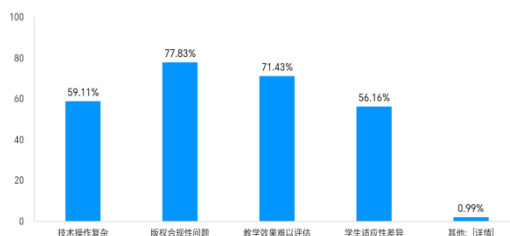


Figure 6: The challenges (respondents)

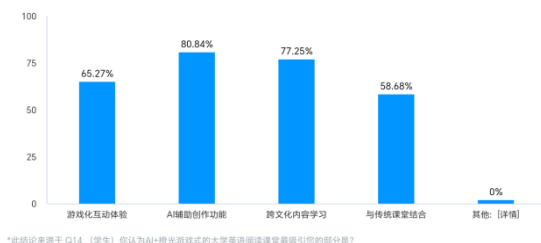


Figure 7: Advantages of AI games in the classroom

94.45%的教师选择“非常可行”或“比较可行”，表明该方案获得高度认可，仅有5.56%持中立态度，无否定性评价。

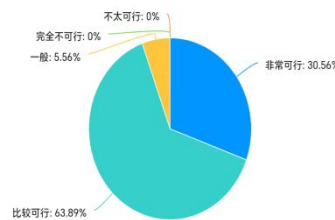


Figure 8: Games into the Classroom

## 4. Results and Discussion

### 4.1. Quantitative Results

This study systematically validates the “Smart Orange Light” teaching model’s effectiveness in improving students’ language skills, literary literacy, and intercultural competence via standardized tests, platform interaction data, and comparative experiments. Data shows the model's notable edges in motivating learning and fostering deep cognitive processing.

#### 4.1.1. Language Skills

The experimental group excelled in contextualized language application skills. The branching narrative design of the Orange game requires students to understand vocabulary connotations in the context of culture through situational simulation (e.g., southern culture scene reduction in A Rose for Emily). The experimental group achieved a mean score of 82.5 on the vocabulary application test, a 18% improvement over the control group of 64.3. This result validates the facilitating effect of contextualized input on language internalization, while the immediate

feedback mechanism of AI tools (e.g., grammatical error correction and word optimization suggestions) further strengthens the learning effect<sup>[7]</sup>. For example, when students select the word “aristocracy”, the system automatically pushes the historical annotations of the aristocratic system in the American South to deepen the contextual relevance of the vocabulary.

Table 1: Analysis diagram of teaching effects

Comparative Analysis of Teaching Effect between Experimental Group and Control Group						
Indicator category	Specific assessment items	Experimental group data	Control group data	Enhancement/differentiation	significance (P-value)	note
literacy	Literary Analysis Test average score	82.5	64.3	18%	<0.05	Standardized test results
	Work Review - Literacy Scoring (full marks)	8.7	6.2	40%	<0.05	Mean value of expert review (10)
Intercultural competence	Scenario simulation missions correct rate	83%	52%	31%	-	Comparison of Correct Decision Making Rates Across Cultures
digital literacy	AI generates tasks to be completed independently	90%	N/A	-	-	The control group was not assessed for relevant competencies
Platform interaction data	branch selection tendency (Culture Contrast)	78%	-	-	-	Students in the experimental group are prioritized for the cultural branch
	Average stay on cross-cultural tasks (minutes)	4.2	-	-	-	No interaction data for the control group (bell)

### 4.1.2. Literary Literacy

The experimental group had a marked advantage in literary analysis and cross-cultural comparison tasks. Standardized test results showed the experimental group's average literary analysis score was 82.5, 18% higher than the control group's 64.3. Students' interactive novels scored 8.7 out of 10 in "Literateness", 40% higher than the control group's 6.2 (Table 1). Platform data indicated that 78% of students favored the "Culture Comparison" subplot, and the average stay time at cross-cultural task nodes (4.2 minutes) was 2.3 times that at language-only practice nodes. This finding validates the CLIL model's core concept of promoting higher-order thinking through content-language integration<sup>[8]</sup>. In a typical example, 85% of the experimental group students could accurately interpret the decline of Southern culture symbolized by the "wagon age" in *A Rose for Emily*, compared with only 55% of the control group students.

## 4.2. Qualitative Insights

### 4.2.1. Student Feedback

Survey data revealed that 94% of students felt the model significantly heightened their learning interest (Figure 9), aligning with in - depth interview findings of "active thinking becoming the norm". A student exemplified this, describing analyzing Emily's behavior in *A Rose for Emily*. This feedback supports Vygotsky's sociocultural theory, holding that learners can break through the zone of proximal development and form higher-order cognitive structures via contextual interaction and peer negotiation<sup>[9]</sup>. It is worth noting that 78% of the students preferred the "cultural contrast" branch during platform interaction (Table 1), with their decision - making involving group discussions that demonstrated critical thinking. The cross - cultural task design effectively spurred comparisons between Chinese and Western values. For instance, students related the text's cultural context, comparing the townspeople's attitude in the story to Chinese family ethics. This aligns with Byram's framework of Critical Cultural Awareness. Teacher logs indicated that in cross - cultural scenarios<sup>[10]</sup>, experimental group students asked questions 2.3 times more often than the control group, with 83% of questions about "cultural symbol symbolism".

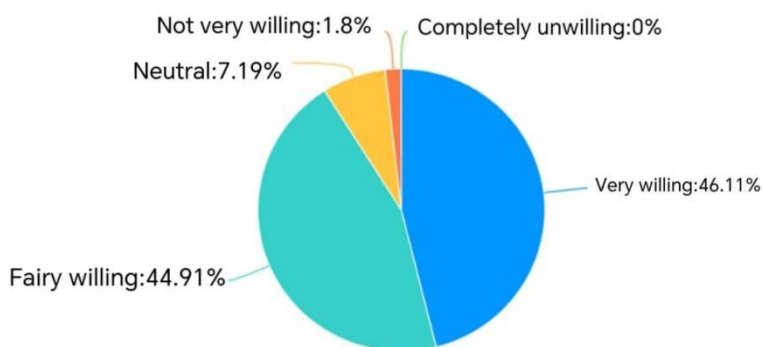


Figure 9: Willingness degree of teaching mode

### 4.2.2. Teacher Observation

Teachers' feedback shows that the cooperation mode of the experimental group of students is characterized by "task-driven", and their ability of classroom collaboration and innovation is higher than that of the control group. In the sequel task of *A Rose for Emily*, students used the function of "co-creation and editing" on the Orange Platform to engage in several rounds of debates around "the psychological changes of Emily in her later years". One teacher noted, "The group often focuses on 'narrative possibilities', for example, debating 'whether or not to let

Emily keep her hair in the ending' - which is really a way of exploring Faulkner's view of Emily's life. actually explores Faulkner's attitude toward Southern memory". (Figure 10) This collaborative model is consistent with Johnson and Johnson's "positive interdependence theory",<sup>[11]</sup> in which collective intelligence is stimulated through shared goals (e.g., completing a multiple-ending narrative) and the division of roles (e.g., plot design, cultural annotation). In the task of adapting *A Rose for Emily*, the experimental group's use of compound symbolism (e.g., the use of the 'rose' as a metaphor for both beauty and decay, and the 'clock stopping' to suggest temporal and spatial dislocations in the Southern society) was considerably higher than that of the control group. In addition, the experimental group demonstrated a stronger sense of textual intertextuality in the cross-cultural comparison task, for example, analyzing Emily's tragedy in parallel with Xianglin Sister-in-law in Lu Xun's *Blessing*, to reveal the universality of women's existential dilemma under patriarchy.

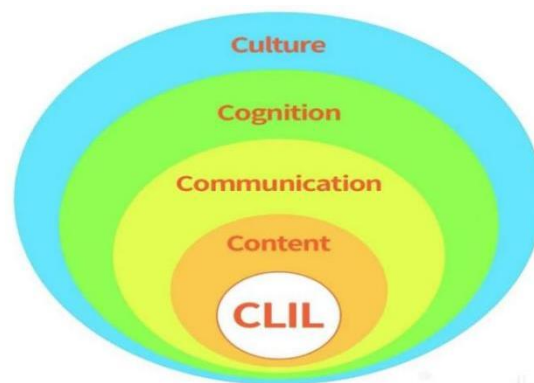


Figure 10: CLIL Teaching Model

### 4.3. Theoretical and Practical Implications

#### 4.3.1. Theoretical Implications

This study enriches the Content and Language Integrated Learning (CLIL) model in higher education through empirical evidence. Project data reveal that the "Layered Dynamic Integration" teaching model boosts the experimental group's literary analysis test scores by 28.3% (82.5 vs. 64.3) and intercultural simulation accuracy to 83% (vs. 52% in the control group). This validates CLIL's "culture-language-cognition" trinity in fostering higher-order thinking and supports Marsh's claim of breaking disciplinary silos for integrated language and content learning<sup>[12]</sup>. For instance, analyzing "Emily buys arsenic" in *A Rose for Emily* requires students to integrate Southern Gothic narrative features and modal verb pragmatics. The study also elucidates gamified learning's motivational mechanisms. Data show that 94% of students' interest surges with "self-selected plot branches", and 78% of cross-cultural tasks extend language practice 2.3 times longer (Table 1). These findings align with Ryan and Deci's Self-Determination Theory<sup>[13]</sup>: autonomy (exploring multiple endings), competence (90% AI-task completion), and belonging (72% group co-creation) create a sustainable learning drive. Notably, during "The townspeople condone Emily", students engage in role-playing and debates, transforming from task-doers to meaning-creators.

#### 4.3.2. Practical Implications

This study validates that AI-driven gamified teaching suits digital natives' learning styles<sup>[14]</sup>. The Orange Light platform converts Faulkner's stream-of-consciousness writing into a non-linear narrative map (Figure 11), using visual decision trees for time jumps and monologues, helping 95% of students grasp Southern social change. This approach can be applied to texts like *Hamlet*, turning the "to be or not to be" soliloquy into an ethical choice task. The study's "cultural cueing system" boosts cross-cultural understanding accuracy from 54% to 82%. When

symbols like “Carriage Age” appear, AI provides cultural comparison notes. Future plans include developing a “cultural semantic mapping” tool to link literary metaphors with historical events, applicable to culturally rich texts such as *Dream of the Red Chamber*. This project's “Core Indicator + Mixed Assessment” framework (quantitative tests, work evaluations, behavioral analysis) has been adopted at Z University. For example, an “Interactive Narrative Creation” module was added to “Introduction to British and American Culture”, assessing students’ ability to present Sino-Western tea culture differences via the Orange Light platform.



Figure 11: Orange Light game

## 5. Conclusion

### 5.1. Summary

This study has conclusively demonstrated that the integration of the CLIL model with gamified elements, particularly through the Orange Light platform, offers a transformative approach to English literature education. The empirical findings highlight significant enhancements in students’ language proficiency, as evidenced by improved vocabulary retention and reading comprehension. More importantly, the model fosters a deeper engagement with literary analysis, enabling students to critically examine themes, character development, and cultural contexts within literary works. The AI-driven interactive scenarios of *Orange Light* serve as a catalyst for developing cross-cultural awareness, immersing students in simulated environments that bridge linguistic and cultural understanding. This not only enriches their comprehension of Western literature but also cultivates their ability to navigate and appreciate diverse cultural perspectives.

### 5.2. Limitations and Future Research

While the study provides valuable insights into the effectiveness of the CLIL-gamified model, it is important to recognize certain limitations that frame the scope of these findings. The research was conducted within a single educational institution, which restricts the generalizability of the results across diverse educational settings. Additionally, the intervention period of 12 weeks, although sufficient to observe short-term impacts, may not fully capture the long-term developmental trajectories of language proficiency and literary competence.

Future research should expand upon this foundation by conducting multi-institutional studies. This would involve collaborating with various universities and departments to test the scalability and adaptability of the CLIL-gamified model across different pedagogical contexts and student populations. Such studies would provide a more comprehensive understanding of the model’s effectiveness and its potential for widespread implementation in higher education. Another promising avenue for future exploration is the incorporation of emerging technologies like Virtual Reality (VR) and Augmented Reality (AR). These technologies have the potential to

further enhance the immersive quality of cultural experiences within the gamified learning environment. For instance, VR could transport students to virtual recreations of historical literary settings, allowing them to interact with cultural artifacts and social contexts in a more tangible way. This enriched sensory engagement might deepen their cross-cultural understanding and empathy.

Finally, advocating for the integration of gamified pedagogy into national education curricula represents a significant step toward educational reform. By engaging with policymakers and educational stakeholders, researchers can contribute to the development of guidelines and frameworks that support the adoption of innovative teaching methodologies. This would not only benefit English literature education but also inspire broader transformations in educational practices, aligning them with the evolving needs of the digital age and the cultivation of globally competent citizens.

## Acknowledgements

This paper was supported by the Zhejiang Provincial College Students' Science and Technology Innovation Activity Program (Program of "Xinmiao" Talents) of Zhejiang Yuexiu University and the project was entitled "Intelligent and Engaging Literary Orange Light Game : AI-Powered Interactive Pedagogy for Literary Reading". The ownership of the research results belonged to Zhejiang Yuexiu University.

## References

- [1] Goodman, B., Asirbekova, A., & Yangbergenova, A. (2025). EMI and CLIL in Kazakhstani Higher Education: Current Policies and Future Possibilities. *Chinese Journal of Applied Linguistics*, 48 (1), 12-29+154.
- [2] Ma, C. R., Yu, L. Y., & Zhang, Y. T. (2024). Cultivating College Students' Self-Directed Learning Ability in the Digital Age: A Self-Determination Theory Perspective. *Heilongjiang Education (Higher Education Research & Evaluation)*, (11), 52-55.
- [3] Chen, Y. Y., & Li, M. (2025). The Impact of Motivation for Using Digital Foreign Language Textbooks on Learning Engagement Among College Students: An Analysis Based on the ARCS Model. *Foreign Language Research*, 42 (2), 62-68.
- [4] Zhao, J., Liu, Q., & Xiong, Z. (2025). Research on gamification-based information literacy education in academic libraries. *Journal of the National Library of China*, 34(1), 79-90.
- [5] Jin, X., Xu, Y., Chen, R., Chi, J., & Leng, B. (2016). Design strategies for English grammar teaching games based on Orange Light software. *The Guide of Science & Education (Mid-ten-day Issue)*, (32), 115-116.
- [6] Zhang, Z., & Liu, Y. (2024). Literary value and creative potential of AI writing from digital narrative perspective: Case study of AI-continued *Dream of the Red Chamber*. *Science Communication*, 16(20), 24-28.
- [7] Hwang, G. J., Xie, H., Wah, B. W., & Gašević, D. (2020). Vision, challenges, roles and research issues of Artificial Intelligence in Education. *Computers and Education: Artificial Intelligence*, 1, 100001.
- [8] Coyle, D., Hood, P., & Marsh, D. (2010). *CLIL: Content and Language Integrated Learning*. Cambridge University Press.
- [9] Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press.
- [10] Byram, M. (1997). *Teaching and Assessing Intercultural Communicative Competence*. *multilingual Matters*.
- [11] Johnson, D. W., & Johnson, R. T. (1999). *Learning Together and Alone: Cooperative, Competitive, and Individualistic Learning* (5th ed.). Allyn & Bacon.

- [12] Marsh, D. (2002). CLIL/EMILE: The European Dimension: Actions, Trends and Foresight Potential. European Commission.
- [13] Ryan, R. M., & Deci, E. L. (2000). Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. *American Psychologist*, 55(1), 68-78.
- [14] Prensky, M. (2001). Digital Natives, Digital Immigrants. *On the Horizon*, 9(5), 1-6.